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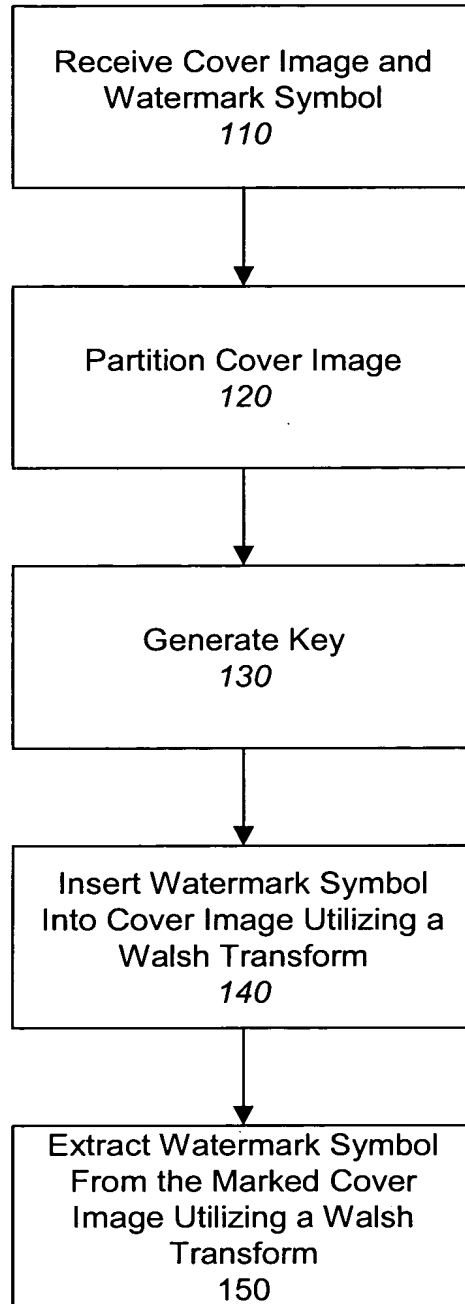
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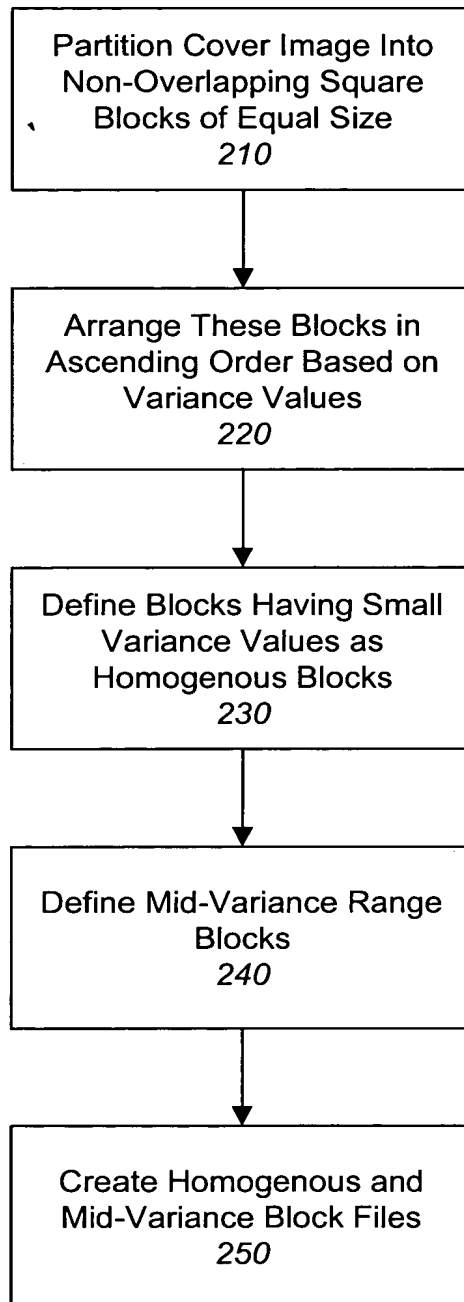
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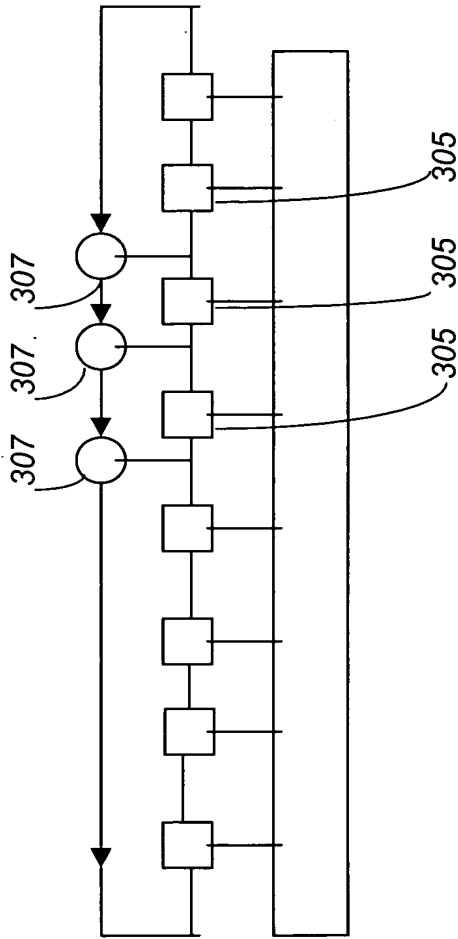
*Figure 1*

200



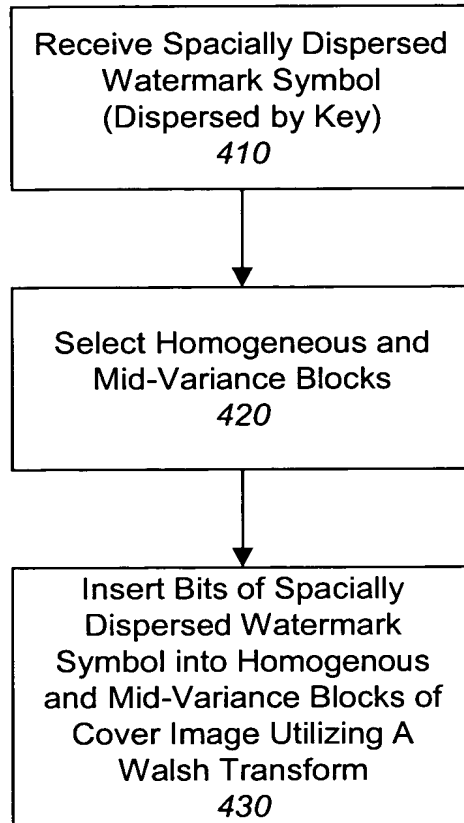
***Figure 2***

300



*Figure 3*

400



***Figure 4***

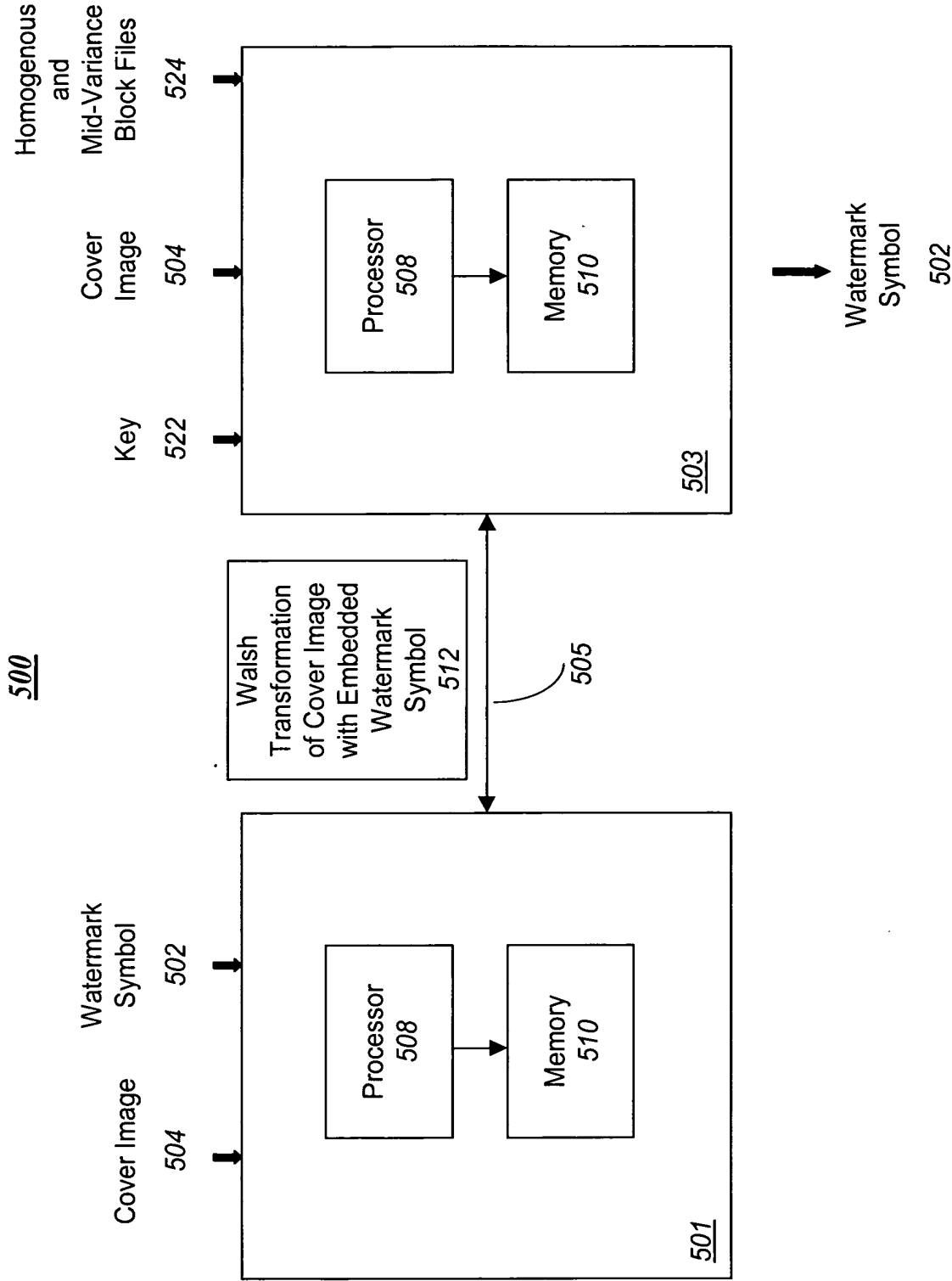


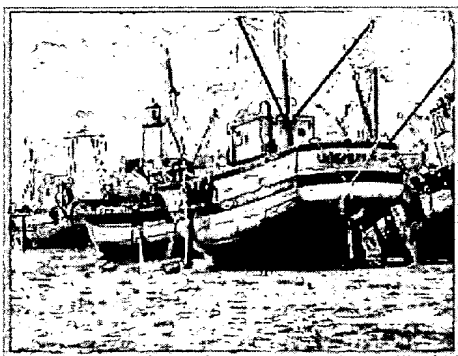
Figure 5



*Figure 6A*



*Figure 6B*



*Figure 7A*



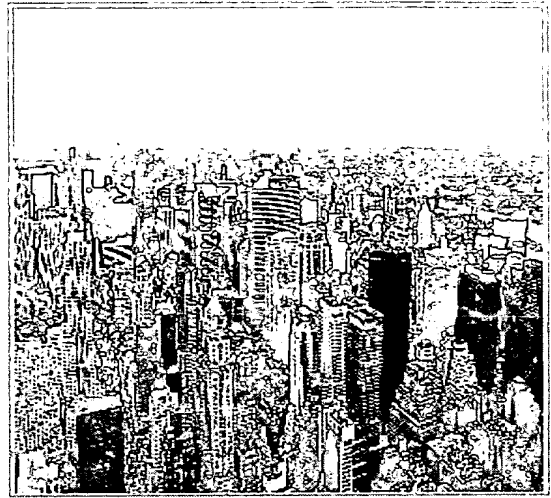
*Figure 7B*



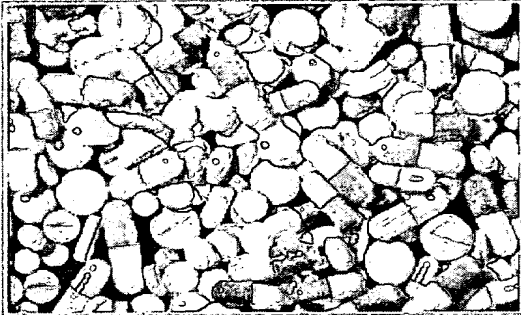
*Figure 7C*



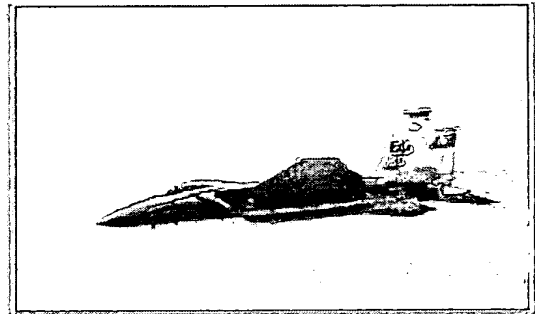
*Figure 6C*



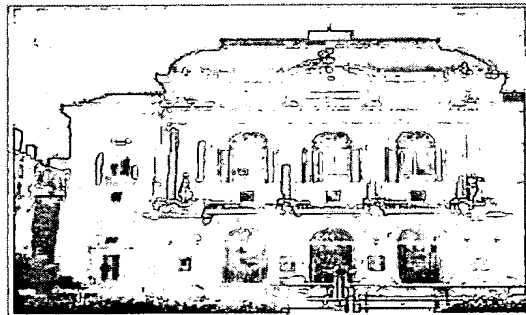
*Figure 6D*



*Figure 6G*

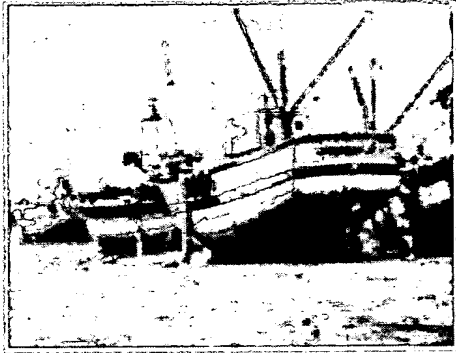


*Figure 6F*

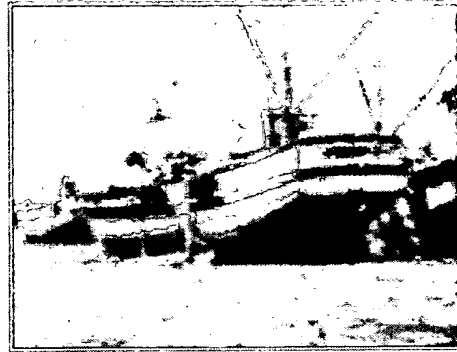


*Figure 6E*





*Figure 8A*



*Figure 8B*



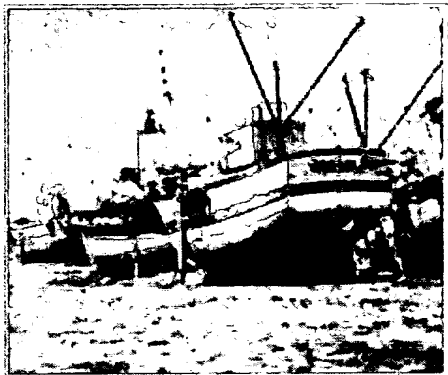
*Figure 9A*



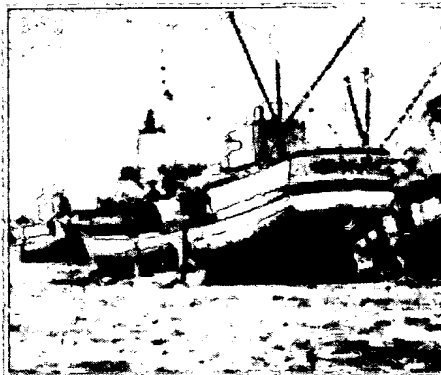
*Figure 9B*

| Test image | Watermarked Image with PSNR (dB) | PSNR (dB) after 1 <sup>st</sup> time mean filtering | Retrieved Logo with NCC value | PSNR (dB) after 2 <sup>nd</sup> time mean filtering | Retrieved Logo with NCC value | PSNR (dB) after 3 <sup>rd</sup> time mean filtering | Retrieved Logo with NCC value |
|------------|----------------------------------|---|-------------------------------|---|-------------------------------|---|-------------------------------|
| Bear       | 34.33                            | 27.77   | Yes (0.988)                   | 25.09   | Yes (0.911)                   | 23.81   | No (0.64)                     |
| NewYork    | 30.40                            | 19.79   | Yes (1.00)                    | 18.77   | Yes (0.904)                   | 18.33   | No (0.31)                     |
| Opera      | 35.49                            | 25.55   | Yes (0.970)                   | 24.18   | Yes (0.89)                    | 23.51   | No (0.66)                     |
| F 151      | 41.67                            | 33.27   | Yes (0.994)                   | 31.13   | Yes (0.923)                   | 29.98   | No (0.56)                     |
| Pill       | 29.95                            | 25.08   | Yes (0.875)                   | 22.68   | Yes (0.762)                   | 21.41   | No (0.61)                     |

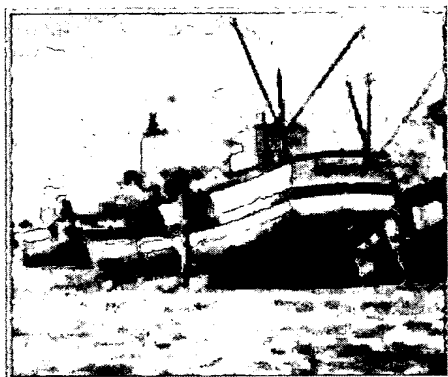
*Figure 10*



*Figure 11A*



*Figure 11B*



*Figure 11C*



*Figure 12A*



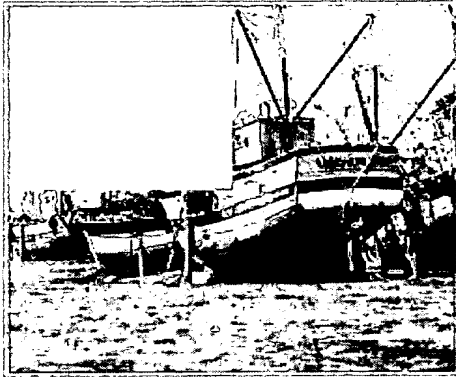
*Figure 12B*



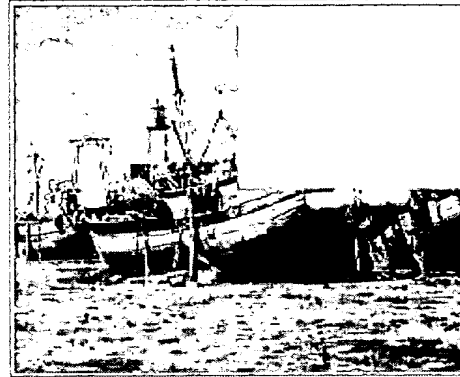
*Figure 12C*

| Test image | Watermarked Image with PSNR (dB) | PSNR (dB) after 1 <sup>st</sup> time median filtering | Retrieved Logo with NCC value | PSNR (dB) after 2 <sup>nd</sup> time median filtering | Retrieved Logo with NCC value | PSNR (dB) after 5 <sup>th</sup> time median filtering | Retrieved Logo with NCC value |
|------------|----------------------------------|---|-------------------------------|---|-------------------------------|---|-------------------------------|
| Bear       | 34.33                            | 29.30   | Yes (0.988)                   | 28.17   | Yes (0.988)                   | 26.35   | Yes (0.988)                   |
| NewYork    | 30.40                            | 19.07   | Yes (1.00)                    | 19.57   | Yes (1.00)                    | 18.94   | Yes (1.00)                    |
| Opera      | 35.49                            | 25.24   | Yes (0.952)                   | 25.63   | Yes (0.952)                   | 24.89   | Yes (0.934)                   |
| F 151      | 41.67                            | 34.61   | Yes (0.988)                   | 34.27   | Yes (0.952)                   | 33.27   | Yes (0.988)                   |
| Pill       | 29.95                            | 28.76   | Yes (0.940)                   | 27.10   | Yes (0.910)                   | 25.31   | Yes (0.92)                    |

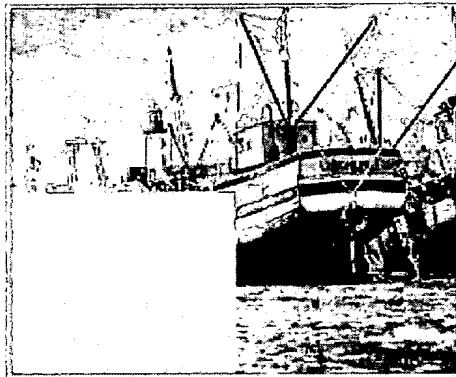
*Figure 13*



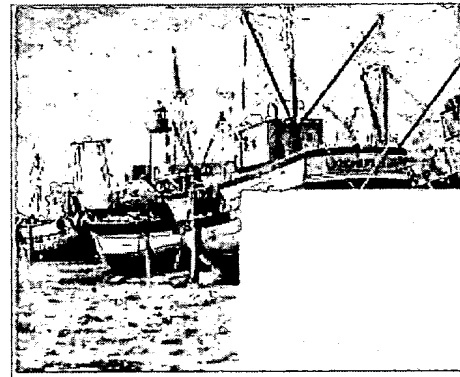
***Figure 14A***



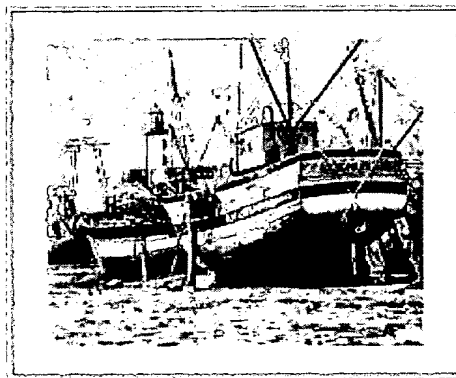
***Figure 14B***



***Figure 14C***



***Figure 14D***



***Figure 14E***



*Figure 15A*



*Figure 15B*



*Figure 15C*



*Figure 15D*



*Figure 15E*

| Test image | Upper-left PSN Value in dB | Retrieved Logo with NCC value | Upper-right PSNR value in dB | Retrieved Logo with NCC value | Lower left PSNR value in dB | Retrieved Logo with NCC value | Lower right PSNR value in dB | Retrieved Logo with NCC value | 20 rows & columns PSNR in dB | Retrieved Logo with NCC value |
|------------|----------------------------|-------------------------------|------------------------------|-------------------------------|-----------------------------|-------------------------------|------------------------------|-------------------------------|------------------------------|-------------------------------|
| Bear       | 15.47                      | Yes (0.95)                    | 17.86                        | Yes (1.0)                     | 14.97                       | Yes (0.96)                    | 12.33                        | Yes (1.00)                    | 14.25                        | Yes (0.98)                    |
| New York   | 15.27                      | Yes (0.82)                    | 15.65                        | Yes (0.74)                    | 17.88                       | Yes (1.0)                     | 15.94                        | Yes (1.0)                     | 14.75                        | Yes (0.69)                    |
| Opera      | 21.11                      | Yes (0.82)                    | 21.48                        | Yes (0.64)                    | 17.54                       | Yes (1.0)                     | 20.03                        | Yes (1.0)                     | 18.63                        | Yes (0.78)                    |
| F151       | 22.10                      | Yes (0.97)                    | 23.27                        | Yes (0.99)                    | 21.00                       | Yes (0.74)                    | 19.57                        | Yes (1.0)                     | 22.40                        | Yes (0.60)                    |
| Pill       | 17.79                      | Yes (0.84)                    | 17.84                        | Yes (0.88)                    | 17.92                       | Yes (0.88)                    | 17.37                        | Yes (0.87)                    | 16.77                        | Yes (0.83)                    |

*Figure 16*

| Test image | Watermarked Image with PSNR (dB) | PSNR(dB) and C.R. value | Retrieved Logo with NCC value | PSNR (dB) and C.R. value | Retrieved Logo with NCC value | PSNR(dB) and C.R. value | Retrieved Logo with NCC value |
|------------|----------------------------------|-------------------------|-------------------------------|--------------------------|-------------------------------|-------------------------|-------------------------------|
| Bear       | 34.33                            | 20.84(dB)<br>33.24      | Yes (0.83)                    | 20.57(dB)<br>36.82       | Yes (0.81)                    | 20.39(dB)<br>39.07      | Yes (0.75)                    |
| New York   | 30.40                            | 16.48(dB)<br>34.97      | Yes (0.80)                    | 16.21(dB)<br>39.93       | Yes (0.80)                    | 16.05(dB)<br>43.43      | Yes (0.77)                    |
| Opera      | 35.49                            | 18.51 (dB)<br>42.80     | Yes (0.84)                    | 18.38(dB)<br>47.01       | Yes (0.63)                    | 18.27(dB)<br>49.99      | Yes (0.72)                    |
| F 151      | 41.67                            | 18.07 (dB)<br>31.89     | Yes (0.83)                    | 18.06(dB)<br>44.32       | Yes(0.79)                     | 18.05 (dB)<br>52.13     | No                            |
| Pill       | 29.95                            | 17.24 (dB)<br>33.29     | Yes (0.86)                    | 17.06(dB)<br>37.37       | Yes (0.86)                    | 16.96 (dB)<br>39.60     | Yes (0.87)                    |

*Figure 17A*





*Figure 18A*



*Figure 18B*

| Test image | Watermarked<br>Image with<br>PSNR (dB) | Inversion of LSB<br>of all pixels;<br>PSNR (dB) | Retrieved<br>Logo with<br>NCC value | Inversion of two<br>LSB(s) of all<br>pixels PSNR<br>(dB) | Retrieved<br>Logo with<br>NCC value |
|------------|--|---|-------------------------------------|--|-------------------------------------|
| Bear       | 34.33                                  | 48.06   | Yes (0.95)                          | 34.59  | Yes (0.81)                          |
| New York   | 30.40                                  | 48.13   | Yes (0.97)                          | 34.32  | Yes (0.69)                          |
| Opera      | 35.49                                  | 48.13   | Yes (0.95)                          | 34.92  | Yes (0.74)                          |
| F 151      | 41.67                                  | 48.13   | Yes (0.89)                          | 34.81  | No                                  |
| Pill       | 29.95                                  | 33.08   | Yes (0.95)                          | 34.88  | Yes (0.83)                          |

*Figure 19*



*Figure 20*



*Figure 22A*

| Test image   | Watermarked<br>image gray<br>level range<br>PSNR (dB) | Change<br>in gray<br>level<br>PSNR<br>(dB) | Retrieved<br>Logo with<br>NCC<br>value | Change in<br>gray level<br>PSNR<br>(dB) | Retrieved<br>Logo with<br>NCC<br>value | Change in<br>gray level<br>PSNR (dB) | Retrieved<br>Logo with<br>NCC<br>value | Change in<br>gray level<br>PSNR<br>(dB) | Retrieved<br>Logo with<br>NCC<br>value |
|--------------|---|--|--|---|--|--------------------------------------|--|---|--|
| Fishing boat | 255 - 1   | 200-50                                     | Yes                                    | 255-50                                  | Yes                                    | 200-1                                | Yes                                    | 200-100                                 | No                                     |
|              | 36.00   | 21.98                                      | (0.92)                                 | 20.07                                   | (0.93)                                 | 18.52                                | (0.93)                                 | 17.25                                   |  |
| Lena         | 243-22  | 200-50                                     | Yes                                    | 243-50                                  | Yes                                    | 200-22                               | Yes                                    | 255-0                                   | No                                     |
|              | 37.80   | 23.42                                      | (0.74)                                 | 23.74                                   | (0.87)                                 | 20.70                                | (0.83)                                 | 27.63                                   |  |
| Bear         | 253-0   | 200-50                                     | Yes                                    | 255-0                                   | Yes                                    | 253-50                               | Yes                                    | 200-100                                 | No                                     |
|              | 34.33   | 18.44                                      | (0.83)                                 | 53.92                                   | (0.94)                                 | 17.05                                | (0.91)                                 | 15.40                                   |  |
| New York     | 255-0   | 200-50                                     | Yes                                    | 200-0                                   | Yes                                    | 255-50                               | Yes                                    | 200-100                                 | No*                                    |
|              | 30.40   | 16.78                                      | (0.95)                                 | 16.18                                   | (0.98)                                 | 20.80                                | 0.98                                   | 14.55                                   |  |
| Opera        | 255-22  | 200-50                                     | Yes                                    | 255-50                                  | Yes                                    | 200-22                               | Yes                                    | 255-0                                   | No                                     |
|              | 35.49   | 23.18                                      | (0.97)                                 | 23.84                                   | (0.98)                                 | 19.75                                | (0.99)                                 | 25.386                                  |  |
| F151         | 255-12  | 255-0                                      | Yes                                    | 255-50                                  | Yes                                    | 200-12                               | Yes                                    | 200-50                                  | No                                     |
|              | 41.67   | 30.84                                      | (0.77)                                 | 21.61                                   | (1.0)                                  | 19.82                                | (1.0)                                  | 25.87                                   |  |
| Pill         | 255-0   | 200-0                                      | Yes                                    | 200-50                                  | Yes                                    | 255-50                               | Yes                                    | 200-100                                 | No                                     |
|              | 29.95   | 18.34                                      | (0.89)                                 | 19.96                                   | (0.87)                                 | 19.35                                | (0.87)                                 | 15.30                                   |  |

*Figure 23*



***Figure 8C***



***Figure 8D***



***Figure 9C***



***Figure 9D***



***Figure 11D***



***Figure 11E***



***Figure 11F***



***Figure 12D***



***Figure 12E***



***Figure 12F***



***Figure 14F***



***Figure 14G***



***Figure 14H***



***Figure 14I***



***Figure 14J***



***Figure 15F***



***Figure 15G***



***Figure 15H***



***Figure 15I***



***Figure 15J***



***Figure 17B***



***Figure 17C***



***Figure 21***



***Figure 22B***



***Figure 18C***



***Figure 18D***